

accordance with the field welding requirements of Section 504 - Structural Steel. The weld shall be ground flush. Base metal repairs in compression areas shall be the same as the repairs for tension areas except that if the depth of the pocket is less than 3 mm [ $\bullet$  in] it shall be faired out by grinding. Replacement studs shall be welded no closer than 25 mm [1 in] from the repair area.

505.051 Inspection Studs will be visually inspected for a full 360° weld flash. Studs not having a full 360° weld collar shall be bent 30° from its original position in a direction away from the missing weld flash. Studs not developing a crack or tear will be considered acceptable. Failing studs shall be removed, replaced and weld areas repaired.

505.06 Method of Measurement Shear connectors shall be measured as one lump sum, consisting of all shear connectors required and acceptably installed. Stud welded anchors and fasteners will be considered incidental to the pay item for which they are required.

505.07 Basis of Payment The accepted quantity of shear connectors will be paid for at the lump sum price.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
505.08     Shear Connectors	Lump Sum

SECTION 506 - PAINTING STRUCTURAL STEEL

Reserved

SECTION 507 - RAILINGS

507.01 Description This work shall consist of the furnishing of all materials for, and the construction of, bridge rail, handrail, and barrier mounted bridge rail in accordance with these specifications and the lines and grades shown on the plans.

507.02 Materials Materials shall meet the requirements of the following Sections of Division 700 - Materials:

Steel Bridge Rail:	Structural Steel	713.01
	Preformed Pads	713.03

Aluminum Hand Rail:	Preformed Pads	713.03
	Aluminum Railings	716.01

Pipe for Steel Pipe Hand Railing shall conform to the requirements of ASTM A53, Grade A or B.

507.03 Drawings The contractor shall prepare shop detail, erection, and other necessary working drawings in accordance with the requirements of Section 105.7 - Working Drawings.

507.04 General Anchor bolts or anchor bolt sleeves shall be set with a template and shall be securely placed in their final position prior to the placement of the embedding concrete. Post anchor assemblies shall be installed to within 5 mm [ $3/16$  in] of theoretical horizontal and vertical location. No field drilling will be allowed to install anchor bolts without approval of the Resident. Post bearing areas shall be dressed smooth and true to grade. Prior to post erection, each rail post location shall be finished to the theoretical elevation determined from profile grade, cross slope and curb height and will not be acceptable until it is within 5 mm [ $3/16$  in] of theoretical elevation, as measured at the top of concrete. Preformed pads shall be used to adjust the rail posts for height and alignment. The number of preformed pads supplied shall be 10% in excess of the theoretical minimum number required. After erection of the railing, the Contractor shall clean the whole assembly, to present a neat and uniform appearance.

507.05 Steel Bridge Railing. Steel railings shall be fabricated in accordance with the requirements of Section 504 - Structural Steel. When called for on the plans, railings shall be galvanized to the requirements of AASHTO M111 (ASTM A123) and/or coated in accordance with Special Provision 506 - Painting Structural Steel.

Rail bars to be used on a radius of 300 m [1 ft] or less shall be curved before the application of any galvanizing and/or coating. Bending tolerance from theoretical horizontal curvature shall be plus or minus 3 mm per meter [ $\bullet$  in/yd], not to exceed 12 mm [ $1/2$  in], total.

507.06 Steel Pipe Hand Railing When called for on the plans, railings shall be galvanized to the requirements of AASHTO M111 (ASTM A123) and/or coated in accordance with Special Provision 506.

507.07 Aluminum Bridge Railing Aluminum sections may be sheared, sawed, or milled. Cut edges shall be smooth and free of burrs.

Holes for rivets shall be drilled full size from the solid or subpunched and reamed.

Rivets shall be cold-driven in the "as-received" condition and the driven head shall be of the cone-point type.

Welding shall be done in conformance with the latest edition of AWS Structural Code-Aluminum D1.2. No welding shall be performed before the approval of the appropriate weld procedures. No field welding is permitted.

To facilitate bending, aluminum extrusions of Alloy 6061-T6 or 6351-T5 may be heated to a maximum temperature of 205°C [400°F] for a period of not more than thirty minutes.

Threaded fasteners shall conform to the requirements of ANSI Standard B1.13M, Class 6g for external and Class 6h for internal threads (ANSI Standard B 1.1, Class 2A for external and Class 2B for internal threads).

507.08 Method of Measurement Railing will be measured as one lump sum unit, fabricated, delivered, erected, and accepted.

507.09 Basis of Payment Railing will be paid for at the contract lump sum price, complete in place. Payment for galvanizing and/or protective coating, when required, shall be included in the lump sum price.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
507.0811 Steel Bridge Railing, 2 Bar	Lump Sum
507.0821 Steel Bridge Railing, 3 Bar	Lump Sum
507.0831 Steel Bridge Railing, 4 Bar	Lump Sum

507.0841	Steel Pipe Hand Railing	Lump Sum
507.0846	Barrier Mounted Steel Bridge Rail: 1 Bar	Lump Sum
507.0848	Barrier Mounted Steel Bridge Rail: 2 Bar	Lump Sum
507.0951	Aluminum Bridge Railing, Pedestrians	Lump Sum
507.0961	Aluminum Bridge Railing, Pedestrian, with Pales	Lump Sum

## SECTION 508 - MEMBRANE WATERPROOFING

**508.01 Description** This work shall consist of furnishing and applying an approved membrane waterproofing to concrete deck surfaces, or other concrete surfaces, with a barrier type membrane in accordance with this specification and in conformance with the plans. When high performance waterproofing membrane is specified, the Contractor shall furnish and install an approved high performance waterproofing membrane to the concrete deck with a pourable or heat welded membrane system applied in accordance with the plans, specifications, and the manufacturer's published recommendations.

**508.02 Materials** When high performance membrane is specified, the materials shall meet the requirements of the manufacturer and shall be one of the approved products on the Department's Prequalified List of Approved Materials for High Performance Waterproofing Membrane. All other membrane shall consist of an adhesive primer, preformed sheet waterproofing membrane, and a mastic with all components being as recommended by the manufacturer and approved by the Department as shown on the Prequalified List of Approved Barrier Membranes maintained by the Department.

**508.04 General** The Contractor shall store and install the membrane and all associated components in accordance with the manufacturer's published recommendations. Priming and membranizing shall only be done when the air and concrete temperatures are above 6°C [40°F] and the surfaces that are to receive the primer and membrane have a moisture content at, or below, 6%. The moisture content will be checked with a "Sovereign Portable Electronic Moisture Master" meter, or an approved equal. Primer or membrane shall not be applied or installed until the concrete has been in place for a minimum of 10 days. Membrane waterproofing remaining on existing structures to be rehabilitated shall be completely removed to the primed surfaces. The entire deck shall be shot blasted to achieve an anchor profile which is clean of all foreign materials, such as oil or grease, and any sharp protrusions removed, and free of laitance. The Contractor shall have a copy of Technical Guideline No. 03732, published by the International Concrete Repair Institute. The final concrete surface profile shall range between a CSP 1 and a CSP 5 as defined by this Guideline. Areas where rapid setting patching